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[0027] With reference to FIGS. 3A and 3B, simulations have shown that the amplitude of the output signal at common node 50 (when driving a 50 Ohm load, see FIGS. 5A-5B) in accordance with the present invention is at least 20 dB higher than that of the output signal at the center tap 2 of inductor Lr of the prior art symmetric oscillator shown in FIG. 1. FIG. 3A shows the output signal at the center tap 2 of inductor Lr of the prior art circuit of FIG. 1 over a frequency band beginning at 8.8 GHz and ending at 14 GHz. The amplitude of the output signal at the center tap 2 (into a 50 Ohm load) is 3.3 mV (RMS) at 8.8 GHz and increases to 27 mV (RMS) at 14 GHz. FIG. 3B shows that the amplitude of the output signal at the common node 50 (into a 50 Ohm load) of a symmetric oscillator of the present invention (similar to the oscillator 20 of FIG. 2) is 51 mV (RMS) at 8.8 GHz and 69 mV (RMS) at 14 GHz. Advantageously, the amplitude of the output signal at the common node 50 of the symmetric oscillator 20 of the present invention is more than 20dB greater than that of the output signal at the center tap 2 of the prior art symmetrical oscillator 1 (FIG. 1). Moreover, the amplitude of the output signal at the common node 50 of the symmetrical oscillator 20 of the present invention is substantially flat, increasing only about 2.6 dB from 8.8 GHz to 14 GHz. In contrast, the amplitude of the output signal at the center tap 2 of the prior art circuit 1 (FIG. 1) increases about 18 dB over the same frequency range. While the present invention is not limited by any theory of operation, it is believed that the advantages of the symmetrical oscillator 20 of the present invention are at least partially the result of avoiding the reactive properties of the reactive element 22 (e.g., the inductor Lr) by taking the 2F output at the common node 50.

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[0029] It is noted that the variable frequency output signal simulation data of FIG. 3B was obtained using a software simulation tool on which a detailed circuit similar to that shown in FIG. 4 was modeled. This detailed circuit is shown in FIGS. 5A-5B, where ancillary chokes, resistors, and capacitors

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used to provide varactor tuning biasing, DC biasing and AC bypassing and coupling are also shown. These ancillary parts have a minor influence on the RF/microwave performance.

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[0016] ~~FIG. 5 is~~FIGS. 5A-5B are a more detailed schematic diagram of a symmetrical oscillator of the type shown in FIGS. 2 and 4, and which was utilized to produce the simulation result of FIG. 3B;

[0027] With reference to FIGS. 3A and 3B, simulations have shown that the amplitude of the output signal at common node 50 (when driving a 50 Ohm load, see ~~FIG. 5~~FIGS. 5A-5B) in accordance with the present invention is at least 20 dB higher than that of the output signal at the center tap 2 of inductor Lr of the prior art symmetric oscillator shown in FIG. 1. FIG. 3A shows the output signal at the center tap 2 of inductor Lr of the prior art circuit of FIG. 1 over a frequency band beginning at 8.8 GHz and ending at 14 GHz. The amplitude of the output signal at the center tap 2 (into a 50 Ohm load) is 3.3 mV (RMS) at 8.8 GHz and increases to 27 mV (RMS) at 14 GHz. FIG. 3B shows that the amplitude of the output signal at the common node 50 (into a 50 Ohm load) of a symmetric oscillator of the present invention (similar to the oscillator 20 of FIG. 2) is 51 mV (RMS) at 8.8 GHz and 69 mV (RMS) at 14 GHz. Advantageously, the amplitude of the output signal at the common node 50 of the symmetric oscillator 20 of the present invention is more than 20dB greater than that of the output signal at the center tap 2 of the prior art symmetrical oscillator 1 (FIG. 1). Moreover, the amplitude of the output signal at the common node 50 of the symmetrical oscillator 20 of the present invention is substantially flat, increasing only about 2.6 dB from 8.8 GHz to 14 GHz. In contrast, the amplitude of the output signal at the center tap 2 of the prior art circuit 1 (FIG. 1) increases about

18 dB over the same frequency range. While the present invention is not limited by any theory of operation, it is believed that the advantages of the symmetrical oscillator 20 of the present invention are at least partially the result of avoiding the reactive properties of the reactive element 22 (e.g., the inductor Lr) by taking the 2F output at the common node 50.

[0029] It is noted that the variable frequency output signal simulation data of FIG. 3B was obtained using a software simulation tool on which a detailed circuit similar to that shown in FIG. 4 was modeled. This detailed circuit is shown in ~~FIG. 5~~FIGS. 5A-5B, where ancillary chokes, resistors, and capacitors used to provide varactor tuning biasing, DC biasing and AC bypassing and coupling are also shown. These ancillary parts have a minor influence on the RF/microwave performance.